

Joan R. Lind

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- Education** Ph.D., Mathematics, University of Washington, August 2005
Research areas: Complex Analysis and Stochastic Analysis
Advisor: Steffen Rohde
- B.A., Mathematics, Augustana College, May 1998, Summa Cum Laude
- Employment** Associate Professor, University of Tennessee. August 2015 – present
Assistant Professor, University of Tennessee. August 2010 – July 2015
Assistant Professor, Belmont University. August 2006 – May 2010
Visiting Instructor, University of Washington, Summers 2007, 2008, 2009
Postdoctoral Associate, Cornell University, Sponsor: Gregory Lawler.
August 2005 – July 2006
- Publications** “Phase transition for a family of complex-driven Loewner hulls,” with J. Utley, *Involve*, to appear, arXiv:2106.14940.
- “Convergence of the probabilistic interpretation of modulus,” with N. Albin and P. Poggi-Corradini, submitted, arXiv:2106.11418.
- “Minimizing the determinant of the graph Laplacian,” with N. Albin and P. Poggi-Corradini, in preparation.
- “The scaling limit of fair Peano curves,” with N. Albin and P. Poggi-Corradini, submitted, arXiv:2106.10376.
- “Status Updates: Increasing communication through calculus pre-reading assignments,” with S. Fleming and A. Ho, *PRIMUS* (2021), <https://doi.org/10.1080/10511970.2021.1940402>.
- “Tangential Loewner Hulls,” *Ann. Fenn. Math.* 46 (2021), no 2, 619–631.
- “Effect of random time changes on Loewner hulls,” with K. Kobayashi and A. Starnes, *Rev. Mat. Iberoam.* 36 (2020), no 3, 771–790.
- “Loewner deformations driven by the Weierstrass function,” with J. Robins, *Involve*, 10 (2017), no 1, 151–164.
- “Regularity of Loewner Curves,” with H. Tran, *Indiana Univ. Math. J.* 65 (2016), 1675–1712.
- “Loewner curvature,” with S. Rohde, *Math. Ann.* 364 (2016), 1517–1534.
- “Spacefilling curves and phases of the Loewner equation,” with S. Rohde, *Indiana Univ. Math. J.* 61 (2012), no 6, 2231–2249.
- “Collisions and spirals of Loewner traces,” with D. Marshall and S. Rohde, *Duke Math. J.* 154 (2010), no. 3, 527–573.

“Hölder regularity of the SLE trace,” *Trans. Amer. Math. Soc.* 360 (2008), 3557–3578.

“Two-sided $SLE_{8/3}$ and the infinite self-avoiding polygon,” with G. Lawler, in *Universality and Renormalization: From Stochastic Evolution to Renormalization of Quantum Fields*, I. Binder, D. Kreimer, ed., *Amer. Math. Soc.* (2007), 249–280.

“A sharp condition for the Loewner equation to generate slits,” *Ann. Acad. Sci. Fenn. Math.* 30 (2005), no 1, 143–158.

Honors/Awards

Graduate Research Mentor of the Year. Awarded by the University of Tennessee Graduate Student Senate. April 2020.

Math Graduate Student Council Teaching Award. Awarded by the mathematics graduate students at the University of Tennessee. April 2018.

Math Graduate Student Council Service Award. Awarded by the mathematics graduate students at the University of Tennessee. April 2016.

Junior Faculty Excellence in Teaching Award. Awarded by the College of Arts and Sciences at the University of Tennessee. December 2015.

Best Teacher Award. Awarded by the mathematics graduate students at the University of Tennessee. April 2015.

NSF award “2014 Barrett Lectures.” 2014.

NSF award “Phases and Deformations of Loewner Evolutions.” 2011 – 2014.

Center for Undergraduate Research in Mathematics (CURM) grant. 2008 – 2009.

Project NExT Fellow. 2007 – present.

NSF VIGRE grant. Funding from the University of Washington’s VIGRE grant to develop and run an undergraduate research project with S. Rohde and to participate with the GK-12 program. Winter–Summer 2005.

Excellence in Teaching Award. Awarded by the Department of Mathematics at the University of Washington. November 2001.

Excellence in Academics Award. Awarded by the Department of Mathematics at the University of Washington. November 2000.

Doctoral Thesis Supervision

David Horton. “Analysis of Weierstrass’ function and its effect on Loewner hulls,” completed August 2018.

Andrew Starnes. “Investigating hulls from the Loewner equation,” completed May 2018.

Masters Project Supervision

Lindsay Grinstead. “Exploring discrete modulus from various viewpoints,” completed April 2021.

Christopher Mesic. “Statistical mechanics and Schramm-Loewner evolution with applications to crack propagation processes,” completed August 2014.

Undergraduate Research Supervision

Jeffrey Utley, project: Phase transitions for Loewner hulls driven by complex-valued functions, May 2020–present.

Gavin Glenn, math honors thesis project: The Loewner equation and the Weierstrass function, 2016–2017.

Hannah Clark, honors project: Loewner spacefilling curves. 2014–2015.

Bridget Jones, project: Loewner bubbles. 2013–2015.

Jessica Robins, project: The Weierstrass function and the Loewner equation. 2013–2014.

Allyse Lamon, project: SLE hitting distributions. 2012.

Zachary Lindsey, math honors thesis project: Computing SLE hulls using arc maps. 2011–2012.

Tim Michaels, project: Simulation of SLE. 2011.

BLEAT (Belmont Loewner Equation Analysis Tool) team: Chris Bishop, Sarah Claiborne, Zane Colgin, Nikki Finuf, Megan Hamilton, Andrew Hill, Cory Hughes, Matt Perry, Natalia Shlonimskaya, Catherine Simpson, Ben Stein, Amy Valentine. This team developed a sophisticated java computer program to simulate solutions to the Loewner differential equation, and used this program to analyze properties of these solutions. Belmont University. 2008–2010.

Neil Kowalewski and Luke Horlsey, project: Generating Hamiltonian paths with backbiting. Belmont University. 2009.

- Invited Talks**
- “Convergence of the probabilistic interpretation of modulus,” invited talk in the Quasiworld Seminar at UCLA. Virtual talk. May 2021.
 - “Overview of the Dirichlet problem for orthodiagonal maps,” invited talk in the Function Theory Study Seminar at Kansas State University. Virtual talk. September 2020.
 - “Slits, spirals and Loewner hulls,” invited talk at the conference “Modern Aspects of Complex Analysis and Its Applications”. Seattle, WA. August 2019.
 - “The effect of random modifications on Loewner hulls,” invited talk at the University of Chicago Probability Seminar. Chicago, IL. May 2019.
 - “Random spanning trees and SLE,” 5-day minicourse given at Kansas State University. Manhattan, KS. May 2019.
 - “Effect of random time changes on Loewner hulls,” invited talk at the SIAM Sectional Meeting. Norman, OK. October 2018.
 - “Effect of random time changes on Loewner hulls,” invited talk at the AMS Sectional Meeting. Newark, DE. September 2018.
 - “SLE and GFF coupling,” invited talk at “Workshop on Analysis and Probability”. Bozeman, MT. August 2017.
 - “Loewner deformations driven by the Weierstrass function,” invited talk at the AMS/MAA joint meetings. Atlanta, GA. January 2017.

“Loewner deformations driven by the Weierstrass function,” invited talk at the AMS Sectional Meeting. Fargo, ND. April 2016.

“The Poisson Point Process,” invited talk at the workshop “Trees in Dynamics and Probability”. Bozeman, MT. August 2015.

“Loewner Curvature,” invited talk at the Newton Institute workshop “Geometry of random walks and SLE: a birthday conference for Greg Lawler”. Cambridge, UK. June 2015.

“Regularity of Loewner Curves,” invited talk at the AMS Sectional Meeting. Lansing, MI. March 2015.

“Perspectives of an Assistant Professor,” invited talk at an AWM mentoring workshop held in conjunction with the SIAM annual meeting. Chicago, IL. July 2014.

“Regularity of Loewner Curves,” invited talk at the AMS Central Section Meeting. Lubbock, TX. April 2014.

“Loewner Curvature,” invited talk at the IPAM workshop “Quasiconformal Geometry and Elliptic PDEs”. Los Angeles, CA. May 2013.

“Random walks and an undergraduate excursion into research,” invited address at the MAA Tennessee state dinner. Nashville, TN. March 2012.

“Spacefilling curves and phases of the Loewner equation,” invited talk at New Trends in Complex and Harmonic Analysis conference. Tenerife, Spain. March 2012.

“Introduction to SLE” and “The Angle-Schramm local limit of planar maps,” invited talks at the workshop “Probabilistic Methods in Geometry and Analysis”. Los Angeles, CA. Aug/Sept 2011.

“Fractal curves and phases of the Loewner equation,” invited talk at the Ahlors-Bers Colloquium. Houston, TX. March 2011.

“Random Walks and Electrical Networks,” invited talk at the workshop “Discrete and Complex Analysis”. Bozeman, MT. July 2010.

“Fractal curves and phases of the Loewner equation,” invited talk at the AMS Western Section Meeting. Albuquerque, NM. April 2010.

“Geometry of Loewner chains,” invited talk in the Probability Seminar, University of Chicago. Chicago, IL. May 2008.

“The Geometry of the Loewner Equation,” invited talk at the BIRS workshop “Dynamics Probability and Conformal Invariance”. Banff, Canada. March 2005.

“The Loewner Equation,” poster presentation, AWM session, AMS/MAA joint meetings. Atlanta, GA. January 2005.

Conference/Program Organization

Co-organizer for the program entitled “The Analysis and Geometry of Random Spaces,” to be held at MSRI, Berkeley, CA. Spring 2022.

Co-organizer for the workshop entitled “Analysis and Geometry of Random Shapes,” held at the Institute for Pure and Applied Mathematics at UCLA, Los Angeles, CA. January 7-11, 2019.

Lead organizer for the 2014 Barrett Lectures: Complex Analysis in Probabilistic Settings, held at the University of Tennessee, Knoxville, TN. June 16-19, 2014.

Co-organizer for the Spring Opportunities Workshop, held at the University of Tennessee, Knoxville, TN. April 9-11, 2014.

Co-organizer for the AMS Sectional Meeting special session entitled “Complex analysis, probability and metric geometry,” held at the University of Tennessee, Knoxville, TN. March 21-23, 2014.

Conference Participation

Quasiworld Workshop. Virtual workshop hosted by UCLA. July 2021.

Virtual Bozeman Workshop. August 2020.

TPSE Math Southeast Regional Meeting on Upper-Division Math Pathways. Atlanta, GA. June 2019.

MAA Southeastern Section Meeting. Cleveland, TN. March 2019.

MAA Southeastern Section Meeting. Clemson, SC. March 2018.

UT Math Summit. Knoxville, TN. March 2017.

MAA Southeastern Section Meeting. Macon, GA. March 2017.

Blackwell Tapia Conference. Knoxville, TN. October 2016.

MAA Southeastern Section Meeting. Birmingham, AL. March 2016.

Random Planar Structure and Statistical Mechanics. Newton Institute workshop, Cambridge, UK. April 2015.

UT Undergraduate Math Conference. Undergraduate research students Hannah Clark and Bridget Jones presented their research. Knoxville, TN. April 2015.

Lee University Regional Undergraduate Mathematics Conference. Undergraduate research students Hannah Clark and Bridget Jones presented their research. Cleveland, TN. February 2015.

Probability on Trees and Planar Graphs. BIRS workshop, Banff, Canada. September 2014.

Nebraska Conference for Undergraduate Women in Mathematics. Undergraduate research student Jessica Robins presented her research. Lincoln, NE. January/February 2014.

36th Conference on Stochastic Processes and their Applications. Boulder, CO. July/August 2013.

PIMS Summer School in Probability. Seattle, WA. June/July 2010.

Conformal maps from probability to physics. Ascona, Switzerland. May 2010.

MAA Southeastern Section Meeting. Elon, NC. March 2010.

Oded Schramm Memorial Conference. Redmond, WA. September 2009.

CURM Spring Conference. Provo, UT. March 2009.

MAA Southeastern Section Meeting. Nashville, TN. March 2009.

Tennessee Academy of Sciences Meeting. Nashville, TN. November 2008.

Workshop for Women in Probability. Cornell University, Ithaca, NY. October 2008.

CURM Workshop for grant recipients. Provo, UT. August 2008.

Mathfest and Project NExT Workshop. Madison, WI. July/August 2008.

MAA Southeastern Section Meeting. Charleston, SC. March 2008.

AMS/MAA joint meetings. San Diego, CA. January 2008.

Mathfest and Project NExT Workshop. San Jose, CA. July/August 2007.

Random Shapes Workshop I. Institute for Pure and Applied Mathematics, Los Angeles, CA. March 2007.

AMS/MAA joint meetings. New Orleans, LA. January 2007.

Probabilistic and Analytical Perspectives on Contemporary PDEs. CNA Summer School, Pittsburgh, PA. May/June 2006.

Mathematics of Schramm-Loewner Evolution and Loop Measures. Workshop held at Cornell University, Ithaca, NY. May 2006.

Percolation, SLE, and related topics. Fields Institute workshop, Toronto, Canada. Sept 2005.

Continuous and Discrete Random Spatial Processes. Lorentz Center workshop, Leiden, Netherlands. April 2004.

Washington Center Mathematics Consortium Fall Meeting: Mathematics in the Disciplines. Conference geared toward the creative teaching of undergraduate level mathematics. November 2003.

MAA PREP workshop entitled Active Learning Approaches to Teaching Mathematics Content Courses for Elementary and Middle-School Teachers. Western Oregon University. Monmouth, OR. July 2003.

Summer Institute for the Mathematical Sciences. A program for undergraduate women math majors, Berkeley, CA. Summer 1996.

Service and Outreach

Director of Math Majors and Minors, University of Tennessee Department of Mathematics. August 2020 – present.

Reviewer for Mathematical Reviews.

Member of an NSF grant review panel.

Presenter at TN Junior Science and Humanities Symposium. March 2021.

Volunteer at “Expanding Your Horizons STEM Activity day,” a program for middle school girls held at NIMBioS. November 2019.

Presenter at the Governor’s School Math Department Open House. June 2017.

Presenter at “Gadget Girls Adventures in STEM,” a program for middle school girls held at University of Tennessee. November 2012, April 2011.

Volunteer at “SHADES (SHaring Adventures in Engineering and Science),” a program for middle school girls held at Knoxville’s STEM academy. October 2012, November 2011.

Teaching

Courses taught at the University of Tennessee:

Advanced Analysis I & II, Complex Analysis, Real Analysis, Seminar on Teaching College Mathematics, Advanced Calculus I & II, Complex Variables, Graph Theory, Analysis I, Introduction to Abstract Mathematics, Introduction to Mathematical Sciences, Differential Equations, Calculus I

Courses taught at Belmont University:

Abstract Algebra, Graph Theory, Linear Algebra, Calculus I, II & III, Calculus for Business, Honors Analytics, Mathematics for Elementary School Teachers, Introduction to Mathematical Reasoning

Course taught at Cornell University:

Finite Mathematics

Courses taught at University of Washington:

Introduction to Modern Algebra for Teachers I & II, Linear Algebra, Calculus I, Precalculus, Mathematics for Elementary School Teachers, Complex Analysis Preliminary Exam Preparation Seminar

K-12 experience:

- Instructor with the University of Tennessee Project GRAD Summer Institute, a program designed to encourage high school and college graduation among urban Knoxville students. June 2014, June 2013.
- GK-12 Fellow at University of Washington. In this role, I partnered with elementary school teachers in leading inquiry-based lessons. Fall 2004–Spring 2005